Aging-Friendly City: Assessment in Queens

F24 GIS Final Project | Gabriela Karnadi gk2691

Page intentionally left blank

Purpose Of This Document

This document serves as part of the GIS Class Final Assignment. The specific aims of this study are to assess and recommend city officials regarding city development for the ageing population through data-driven analysis and decision-making.

Table of
Content

01 Background

This section presents the underlying conditions that New York City (NYC) faces and needed to address, especially towards its demographic.

NEW YORK CITY & ELDERLY

Right now

17.3%

2023 American Community Survey 1-Year Estimates

In 15 years

40% jump

City of New York Projected Population 2010-2040 - Summary

Based on the 2023 American Community Survey (ACS), 17.3% of New York City's population are aged 65+. This age bracket is also called as aging population or the elderly. Moreover, some calculation shows that in 2040 there will be a 40% hike in the elderly population than the 2023 population. The significant increment is due to higher life expectancy.

IS THE CITY *READY?*

Research Questions Breakdown

There are efforts from the government to cater for the ageing population right now through the New York City Department for the Aging (DFTA) in which the department focuses on services and activities. The city's spatial and built environment does not yet focus on preparing for the ageing population. Especially in the next 15 years and more, when the city are having more and more elderly, there should be an improvement for the blooming ageing population.

To improve the city's spatial realm, we need to assess what and where the improvement should be done and which are the priority areas. Based on that, this study revolves around the **research questions**:

1. *What* are the *parameters* of the ageing-friendly city?
2. *What are & where* city features should be *improved*?
3. *Where* development should be *prioritized* for an ageing-friendly city?

02 Methodology

This section lays out the method and analysis applied in this study along with its framework and workflow. The main analysis tools will be GIS using spatial-based data empowered with demographic data.

Parameters of Ageing-Friendly City

A city is a place where all of its residents regardless of age, sex, and background can live and thrive, thus a city should continue to keep developing to help its diverse residents have a good quality of life. The lack of the city's amenities and development should not be a hindrance to a group of people who cannot live a good life. The data shows us that the elderly population are increasing and we need to make sure the city is keeping up with that.

The elderly should be ageing healthily. According to WHO, healthy ageing is "the process of developing and maintaining the functional ability that enables wellbeing in older age."

The core of healthy ageing is to take care the functional ability. The functional ability consists of an individual's intrinsic capacity, the characteristics of their surrounding environment, and the interaction between these factors.

The environment plays a part in healthy ageing, especially for the population that lives in a city thus the city's spatial realm is the environment that factors in healthy ageing.

By knowing the parameters of an ageing-friendly city we can see whether certain areas in the city are already for the ageing population, especially with the most populated areas of elderly people.

WHO breaks down the functional ability for healthy ageing that will be used as our parameter for an ageing-friendly city. Those parameters are:

Meet Their Basic Needs

Learn, Grow And Make Decisions

Be Mobile

Build & Maintain Relationships and Contribute To Society.

Socioeconomic Parameters

yahoo!finance

The average American millionaire is 61 years old — here's why young people are having a hard time joining the $1M club

Sabina Wex
June 21, 2024 • 3 min read   54

From 1992 to 2022, the average age of a millionaire increased from 57 to 61, according to a *Business Insider* analysis of data from both years' Survey of Consumer Finances (SCF), which is conducted by the Federal Reserve.

BUSINESS INSIDER

ECONOMY

Meet the typical millionaire: They're over 55, have a house worth nearly 7 figures, and are probably moving to Scottsdale

Juliana Kaplan   ↪ Share   🔖 Save

The New York Times

Earl Boyd, 83, moved into a Manhattan homeless shelter in May and often hangs out across the street. Ahmed Gaber for The New York Times

Why More Older New Yorkers Are Ending Up in Homeless Shelters

The number of people older than 65 who are living in shelters is growing quickly, in an unheralded sign of New York City's affordable housing crisis.

Besides city's spatial realm, the to address the ageing population accurately, socioeconomic parameters should be weighted in to make sure the development is equal and just. The headlines above shows that within the same age bracket, a huge disparity of income happened and affect their ability to afford basic needs. The socioeconomic factors should be considered to prioritize the provision for those who cannot afford their needs.
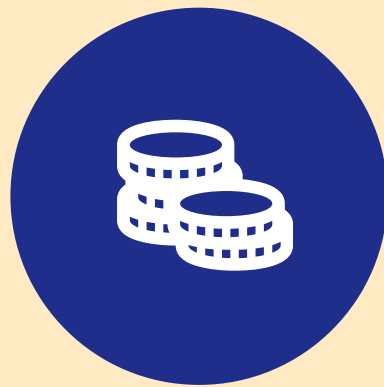
Combining the ageing-friendly parameters with socioeconomic factors give us not just

Where and what're the most lacking,

but also,

Where's the most needed

The socioeconomic parameters that are included are:

Income

To check the income distribution (per census tract) and give more weight to the less income level as they have more limitations to afford any help and accommodations for their daily life in the ageing body.
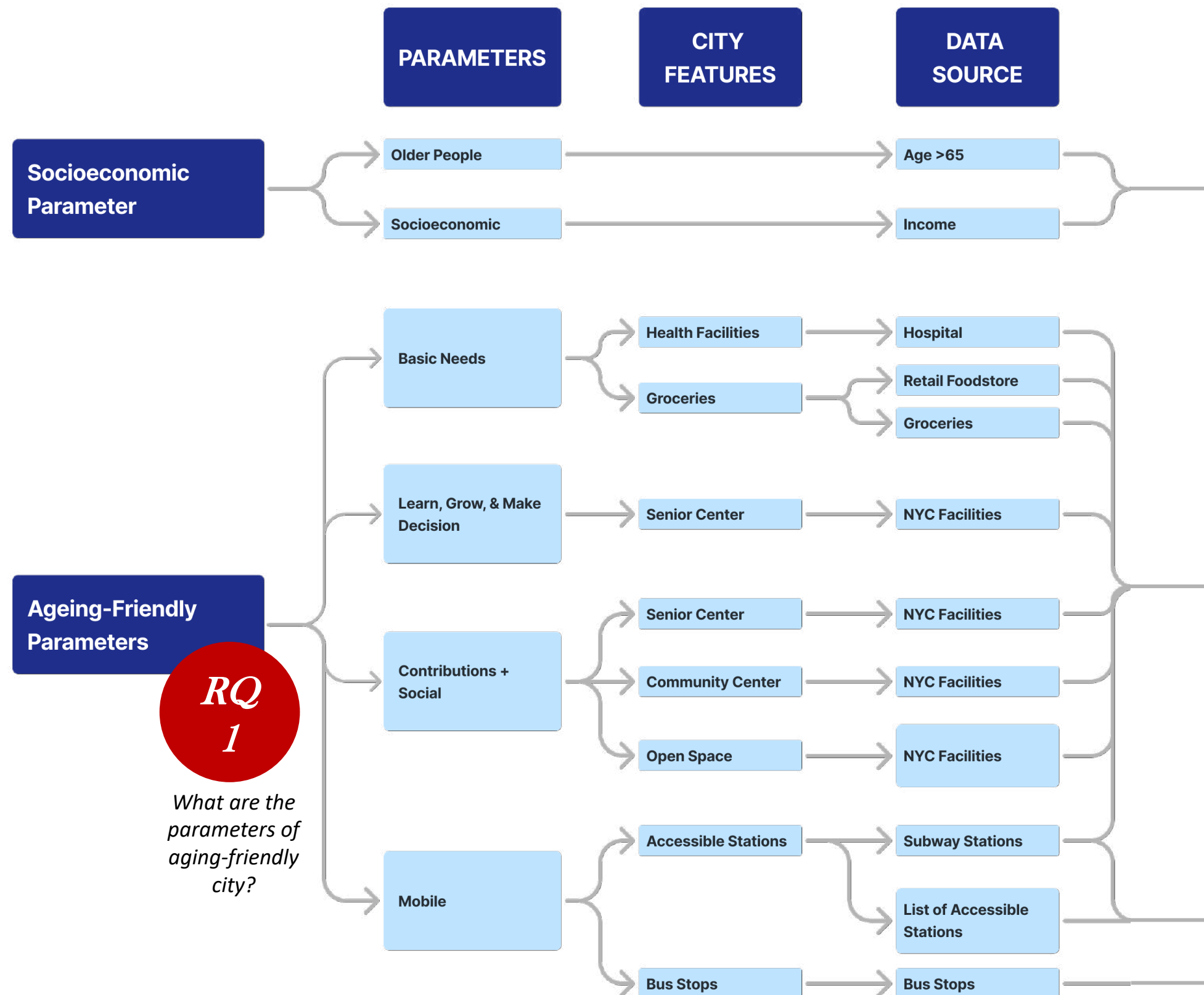

Age Mapping

To check the distribution of elderly in the area (per census tract) with the awareness that more elderly means it needs more amenities and priority to attain an ageing-friendly city.
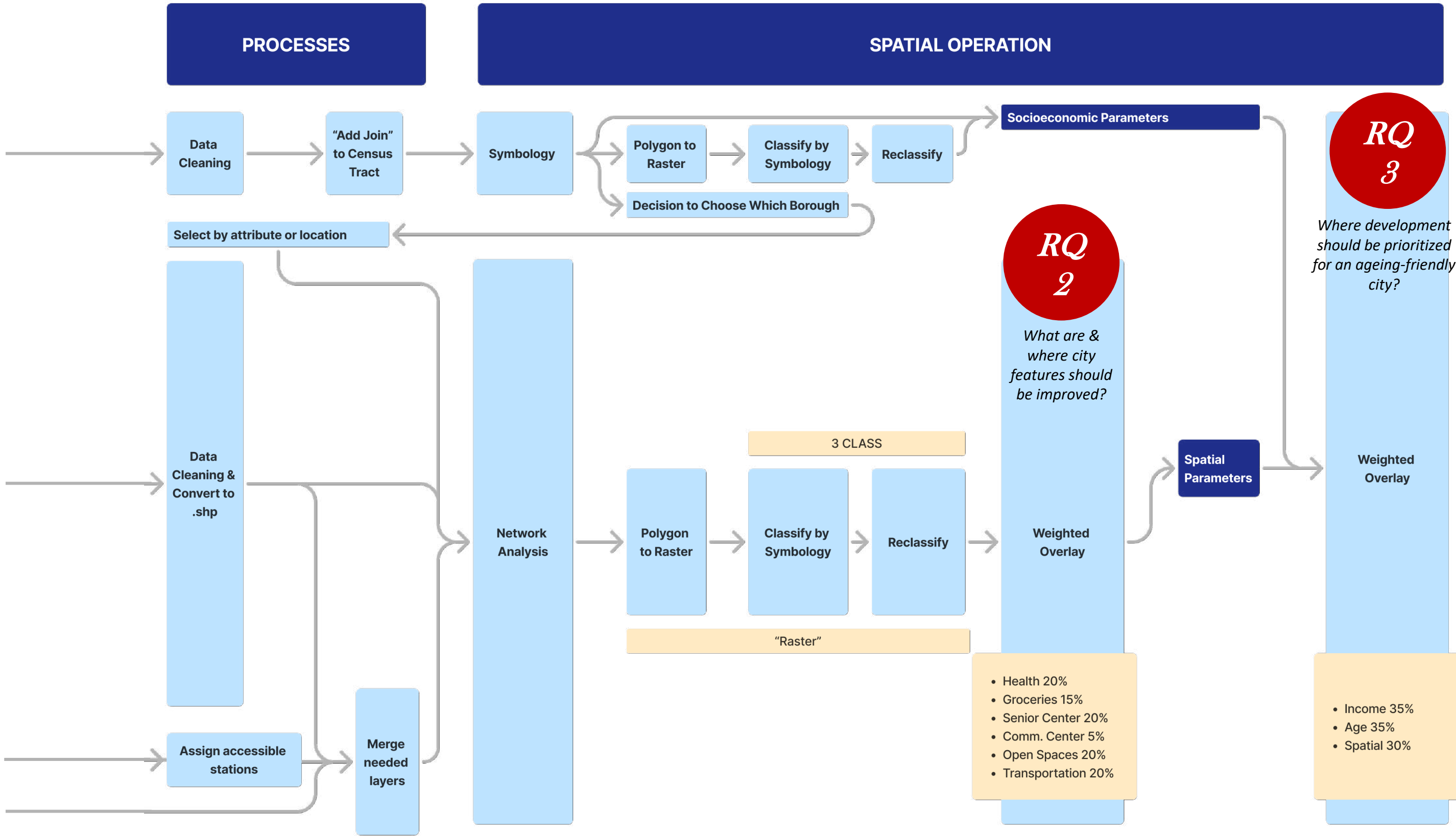
METHODOLOGY

Working flow of this study

The socioeconomic parameters, especially the older people population mapping, will determine which borough is the focus area of study.

The ageing-friendly parameters can be measured by seeing what are the city's features that make the parameters attainable. As it is translated into city features and spatial data (shapes & points data type), it becomes spatial parameters

PARAMETERS	CITY FEATURES	DATA SOURCE

Socioeconomic Parameter
- Older People → Age >65
- Socioeconomic → Income

Ageing-Friendly Parameters

RQ 1
What are the parameters of aging-friendly city?

- Basic Needs
  - Health Facilities → Hospital
  - Groceries → Retail Foodstore / Groceries
- Learn, Grow, & Make Decision
  - Senior Center → NYC Facilities
- Contributions + Social
  - Senior Center → NYC Facilities
  - Community Center → NYC Facilities
  - Open Space → NYC Facilities
- Mobile
  - Accessible Stations → Subway Stations
  - List of Accessible Stations
  - Bus Stops → Bus Stops

Workout the parameters into **spatial analysis in GIS**

PROCESSES

SPATIAL OPERATION

Data Cleaning → "Add Join" to Census Tract → Symbology

Polygon to Raster → Classify by Symbology → Reclassify

Socioeconomic Parameters

Decision to Choose Which Borough

Select by attribute or location

RQ 3

Where development should be prioritized for an ageing-friendly city?

RQ 2

What are & where city features should be improved?

Data Cleaning & Convert to .shp

Network Analysis

3 CLASS

Polygon to Raster → Classify by Symbology → Reclassify → Weighted Overlay

"Raster"

Spatial Parameters

Weighted Overlay

Assign accessible stations → Merge needed layers

- Health 20%
- Groceries 15%
- Senior Center 20%
- Comm. Center 5%
- Open Spaces 20%
- Transportation 20%

- Income 35%
- Age 35%
- Spatial 30%

03 Analysis

This section presents the result of GIS spatial

analysis results through maps and their

calculation matrix (if applied)

AGEING POPULATION

NYC 65+

1.8 mill

To see the distribution of the ageing population, the symbology is used to visualize where the most populated borough with the most ageing population.
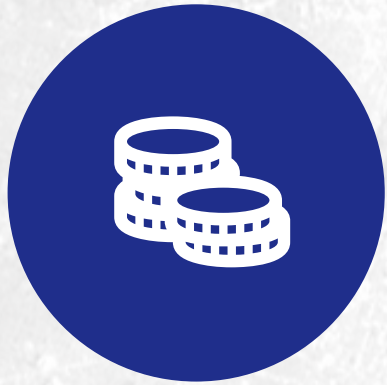

Legend:
- 0-400
- 400-800
- 800-1,200
- 1,200-1,950
- 1,950-4,100

N

0 1 2 3 4 Miles
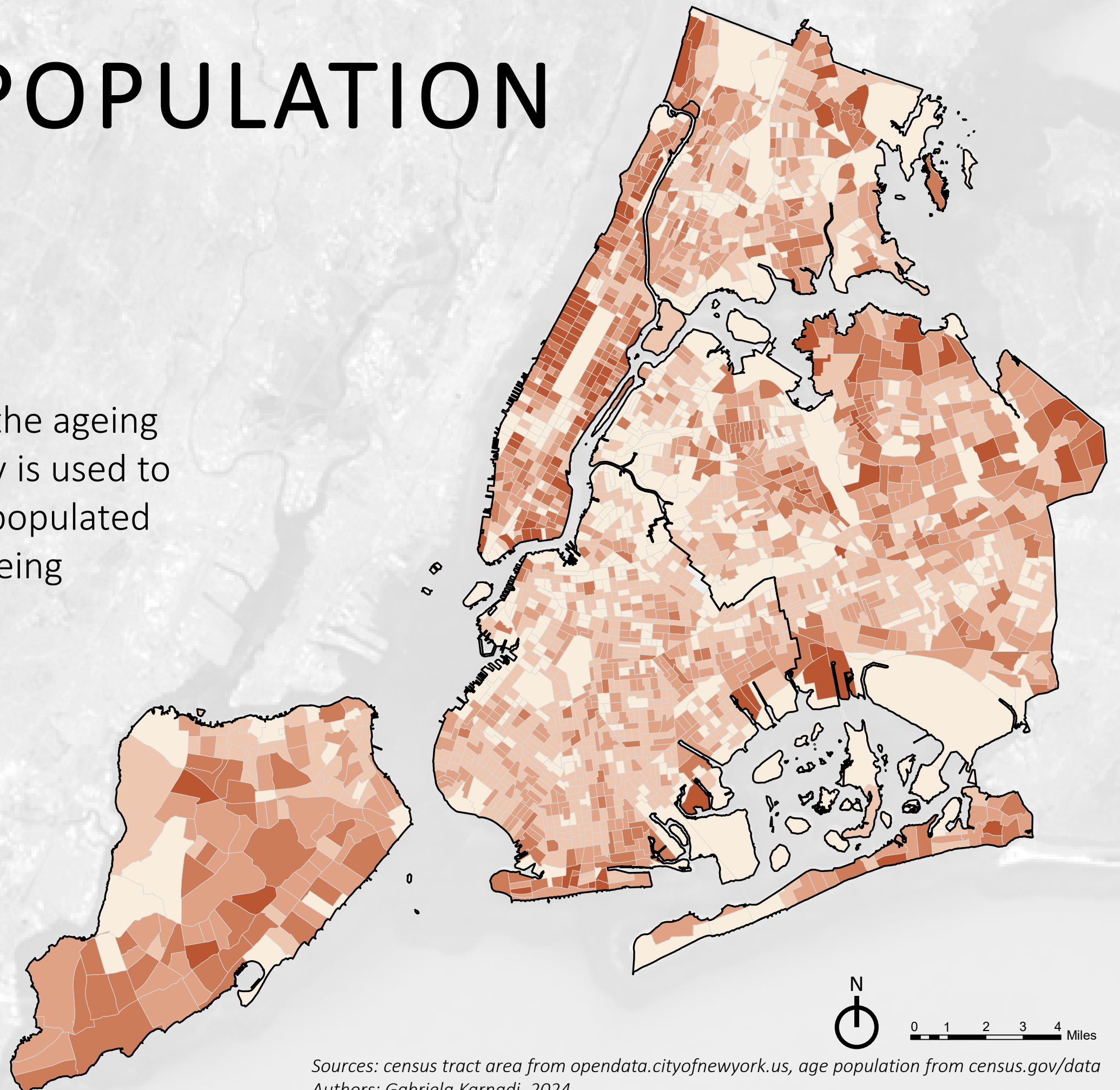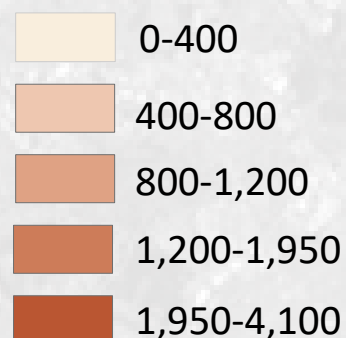
Sources: census tract area from opendata.cityofnewyork.us, age population from census.gov/data
Authors: Gabriela Karnadi, 2024

This study will focus on the most populated ageing borough which Queens has the most elderly population in NYC. We will assess the borough with the most populated elderly.

MANHATTAN
750,750

BRONX
268,479

QUEENS
540,632

STATEN ISLAND
116,024

BROOKLYN
534,104

N

0 0.5 1 2 3 4 Miles
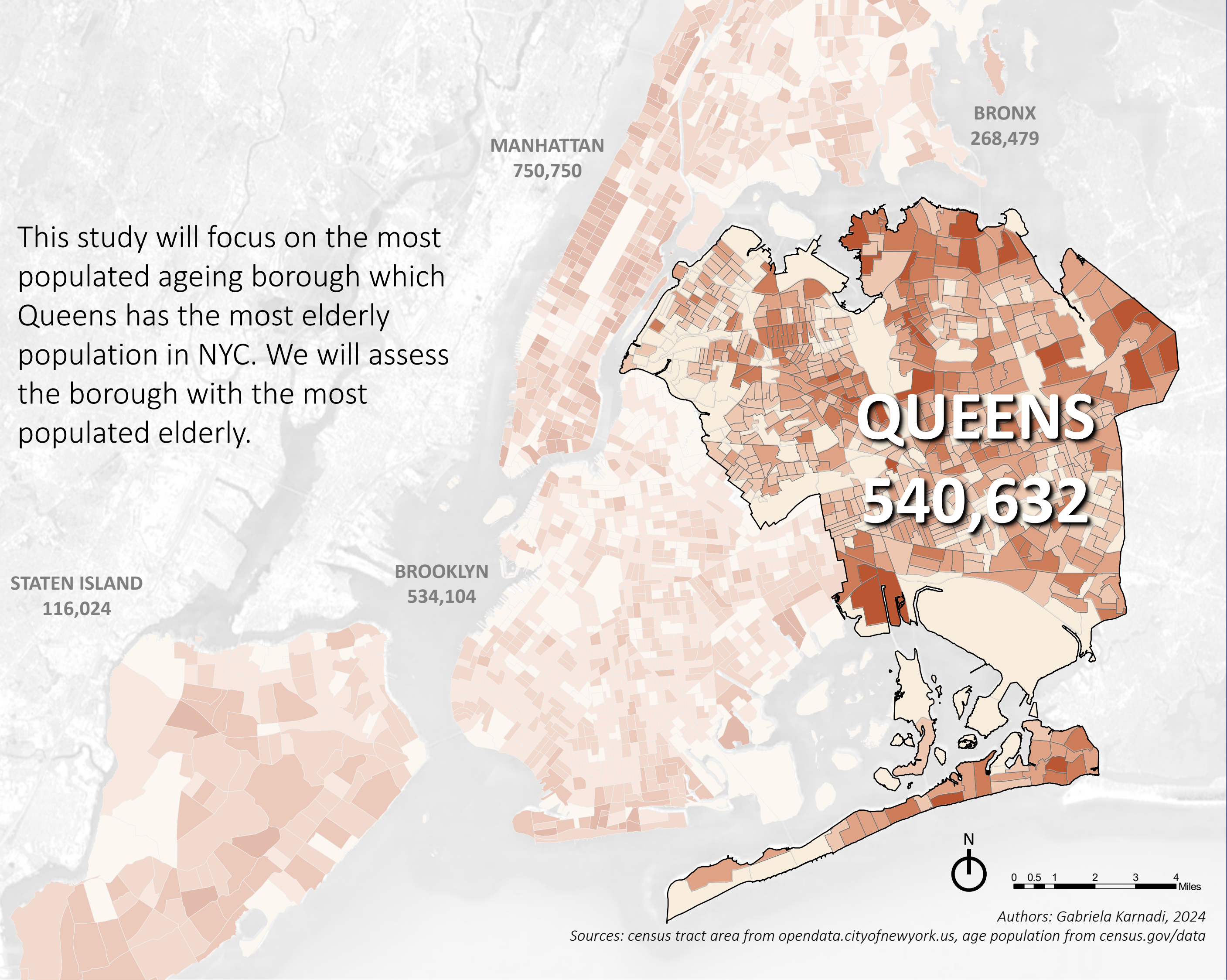
MEDIAN INCOME

On the south of Queens, near Jamaica and John F. Kennedy Airport and along the central belt has the highest median income, marked by a darker color.

SPATIAL ANALYSIS
Symbology

MATRIX
Normalization per population

DESCRIPTION
Mapping the distribution of income in Queens as factors in determining areas that should be prioritised in ageing-friendly development

Excluded Areas (Open Spaces & other unoccupied areas)

≤ 858

858-1,405

1,406-2,133

2,133-4,482

N

0 0.5 1   2   3   4
Miles

HEALTH CARE

Hospitals concentrated in certain areas leaving the north and east of Queens far from hospital service within walking distance.
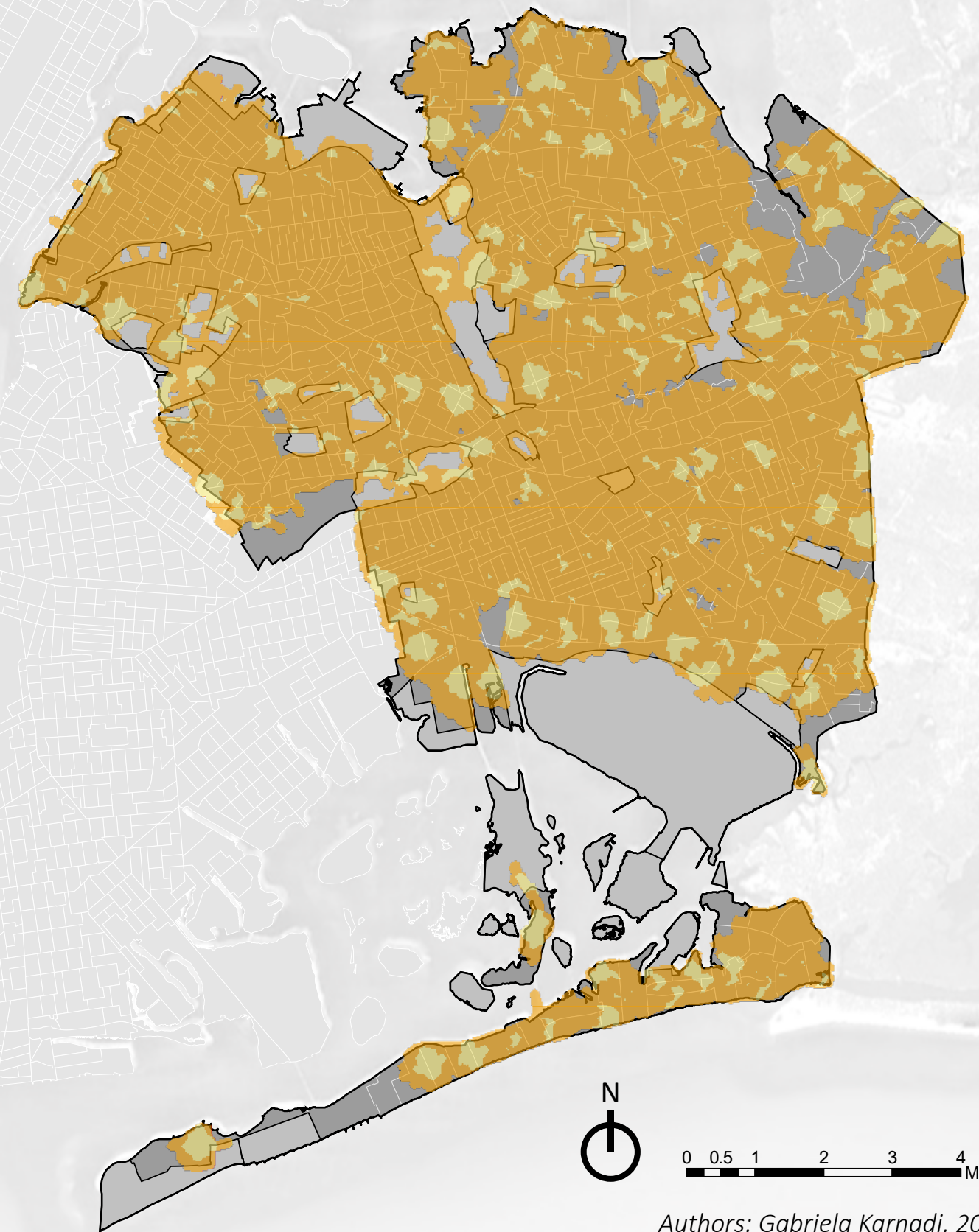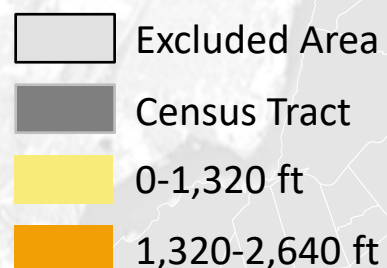
SPATIAL OPERATION
Network Analysis.

MATRIX
Walking Distance of 1,32 ft (0.25 miles) and 2,64 ft (0.5 miles) as assumed walking distance of the elderly + location points of hospitals

DESCRIPTION
Mapping the health service and facilities as part of basic needs for the elderly.

Excluded Area
Census Tract
0-1,320 ft
1,320-2,640 ft

N

0   0.5   1   2   3   4
Miles

Authors: Gabriela Karnadi, 2024

DAILY NEEDS

Groceries on different scales are within walking distance across Queens.

SPATIAL OPERATION
Network Analysis.

MATRIX
Walking Distance of 1,32 ft (0.25 miles) and 2,64 ft (0.5 miles) as assumed walking distance of the elderly + location points of foodstore, groceries, food markets.

DESCRIPTION
Mapping the groceries as daily needs parameters for the elderly.

Excluded Area

Census Tract

0-1,320 ft

1,320-2,640 ft

N

0   0.5   1   2   3   4
Miles

Authors: Gabriela Karnadi, 2024

Sources: census tract area, foodstores and healthy shops from opendata.cityofnewyork.us

ABILITY to MOBILE

Accessible subway stations and bus stops are nearly covering Queens within walking distance.
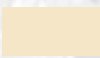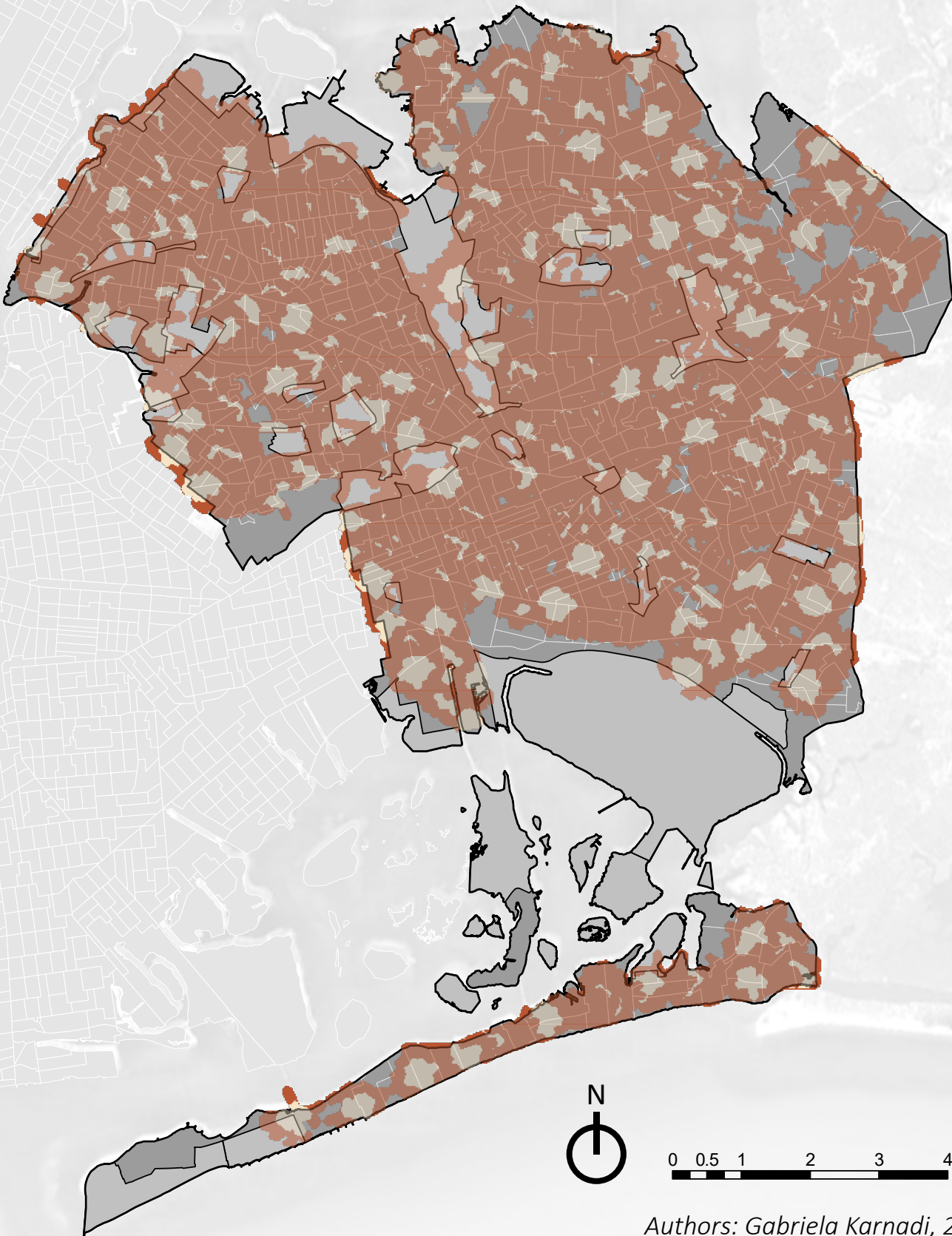
SPATIAL OPERATION
Network Analysis.

MATRIX
Walking Distance of 1,32 ft (0.25 miles) and 2,64 ft (0.5 miles) as assumed walking distance of the elderly + location points of bus stops and accessible subway stations

DESCRIPTION
Mapping the coverage of accessible subway stations combined with bus stops as a way to be mobile and independent for the elderly.

Legend:
- Excluded Area
- Census Tract
- 0-1,320 ft
- 1,320-2,640 ft

N

0 0.5 1 2 3 4 Miles

Authors: Gabriela Karnadi, 2024

SOCIAL LIFE & to CONTRIBUTE

Open spaces, senior centers, and community centers all combined not covering enough the area.

SPATIAL OPERATION
Network Analysis.

MATRIX
Walking Distance of 1,32 ft (0.25 miles) and 2,64 ft (0.5 miles) as assumed walking distance of the elderly + location points of parks, plazas, privately owned public spaces, senior centres, and community centres

DESCRIPTION
Mapping the places for elderly to socialize and be able to contribute
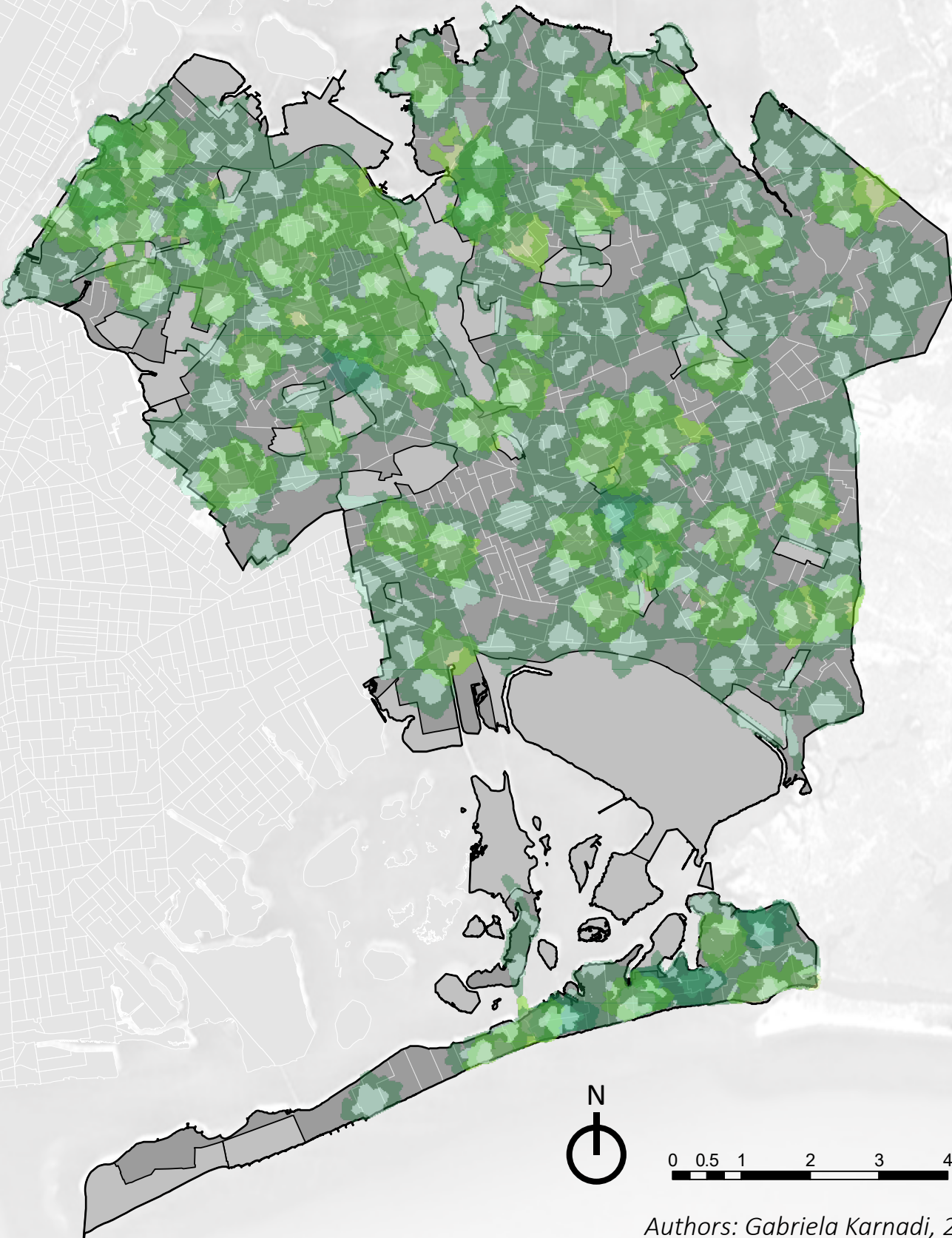
	Excluded Area
	Census Tract

Open Spaces
- 0-1,320 ft
- 1,320-2,640 ft

Senior Center
- 0-1,320 ft
- 1,320-2,640 ft

Community Center
- 0-1,320 miles
- 1,320-2,640 ft

N

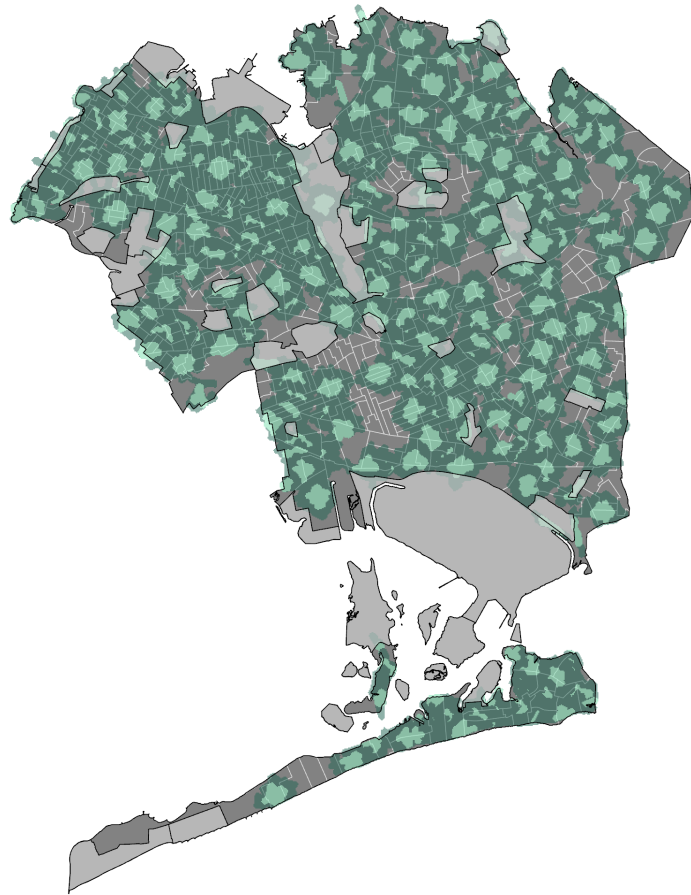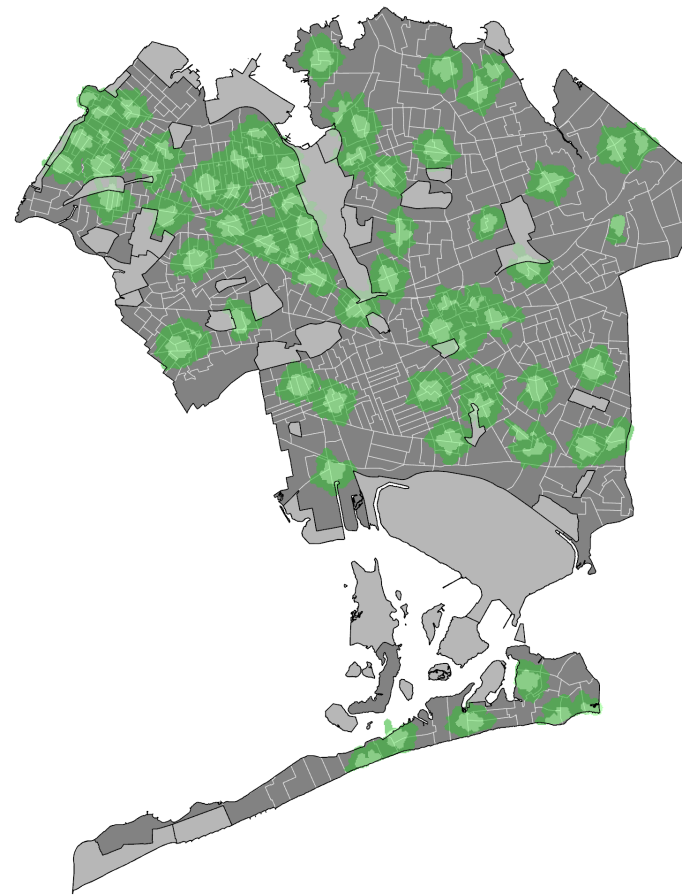0 0.5 1 2 3 4 Miles

Authors: Gabriela Karnadi, 2024
Sources: data are from opendata.cityofnewyork.us
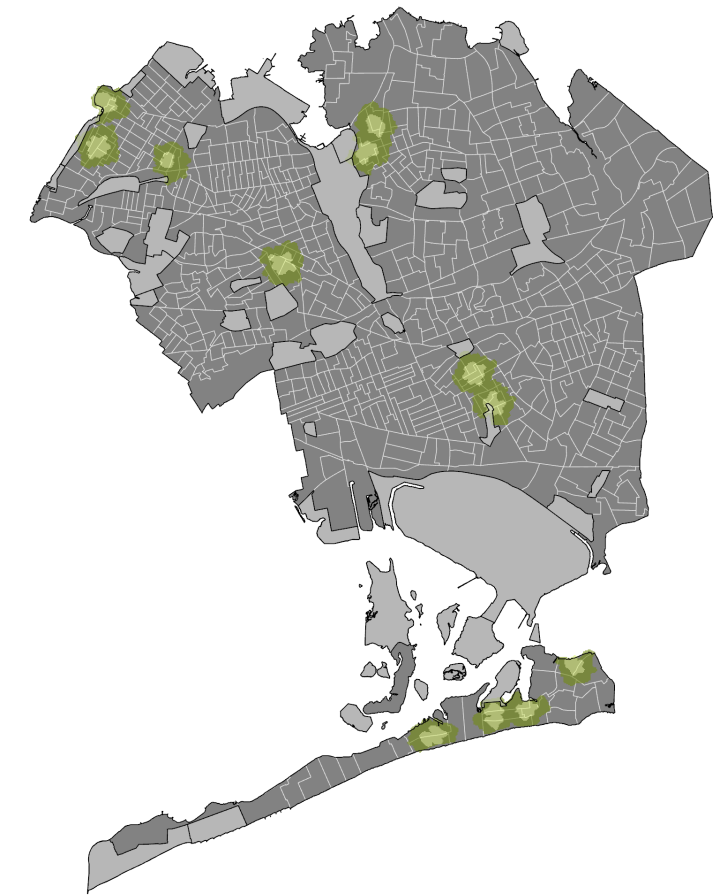
Open Spaces
(Parks, Plazas, and Privately
Owned Public Spaces)

Senior Center
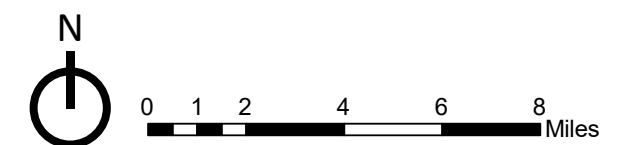
Community Center

Excluded Area

Census Tract

Open Spaces

0-1,320 ft

1,320-2,640 ft

Senior Center

0-1,320 ft

1,320-2,640 ft

Community Center

0-1,320 miles

1,320-2,640 ft

N

0 1 2   4   6   8
Miles

AGEING-FRIENDLY IN QUEENS

The spatial parameters within walking distance in Queens

SPATIAL OPERATION

Weighted Analysis.

MATRIX

- Weighted Percentage
- Based on classification on Class-Network Analysis Table
- Pixel: 100. To gain a smoother pixel output and capture detailed area calculation (small change is documented).
- Scale: 10. To capture a more expansive range.

WEIGHTED PERCENTAGE

Health
20%

Groceries
15%

Senior Center
20%

Open Spaces
20%

Transportation
20%

Community Center
5%
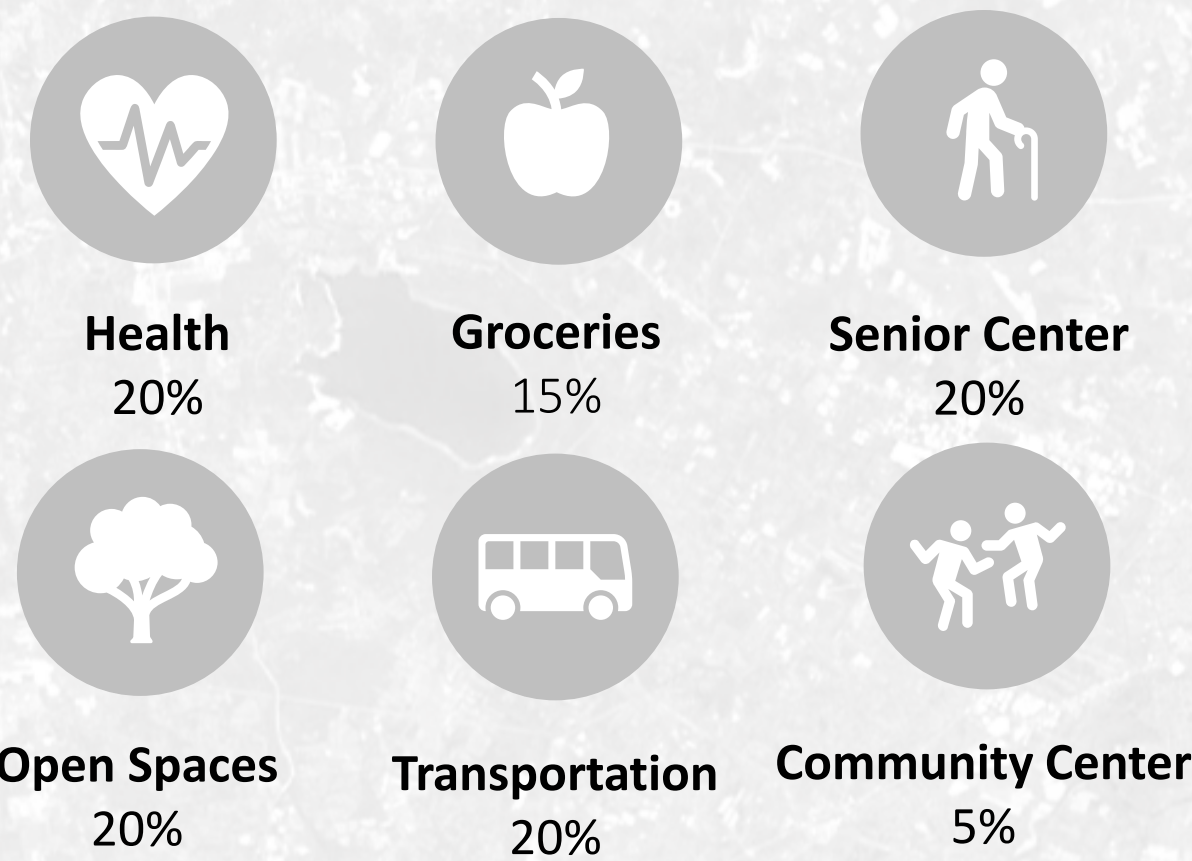
CLASS-NETWORK ANALYSIS TABLE

Network Analysis	Reclassify	Preference	Weighted Overlay
0.25 mile	3	Ideal	1
0.5 mile	2	Good	5
>0.5 mile	1	Not Ideal	10
NO DATA	1	NO DATA	10

The table explains that when classifying, the result of network analysis, the **ideal distance** will get **3 (highest number)** but when it is in weighted overlay, **the ideal distance** from the network analysis gets **1 (the smallest)**. The **NODATA is** assigned with numbers instead of 0 or no data because NODATA represents the >0.5 miles, the inaccessible distance that needs to be counted in the weighted overlay.

The weighted overlay shows that there are still many areas that need improvement as shown by bright colors (yellow and orange).

The improvement should focus on the spatial parameters that are still lacking, especially for hospitals, senior or community center, and open spaces.

Excluded Area

Very Good

Need Improvement

West of Douglaston Little meck

East periphery of Queens

Glendale

South Ozone Park and bordering area with JKF airport

Rosedale

Broad Channel

N

0 0.5 1   2   3   4
                                    Miles

Authors: Gabriela Karnadi, 2024
Sources: data are from opendata.cityofnewyork.us
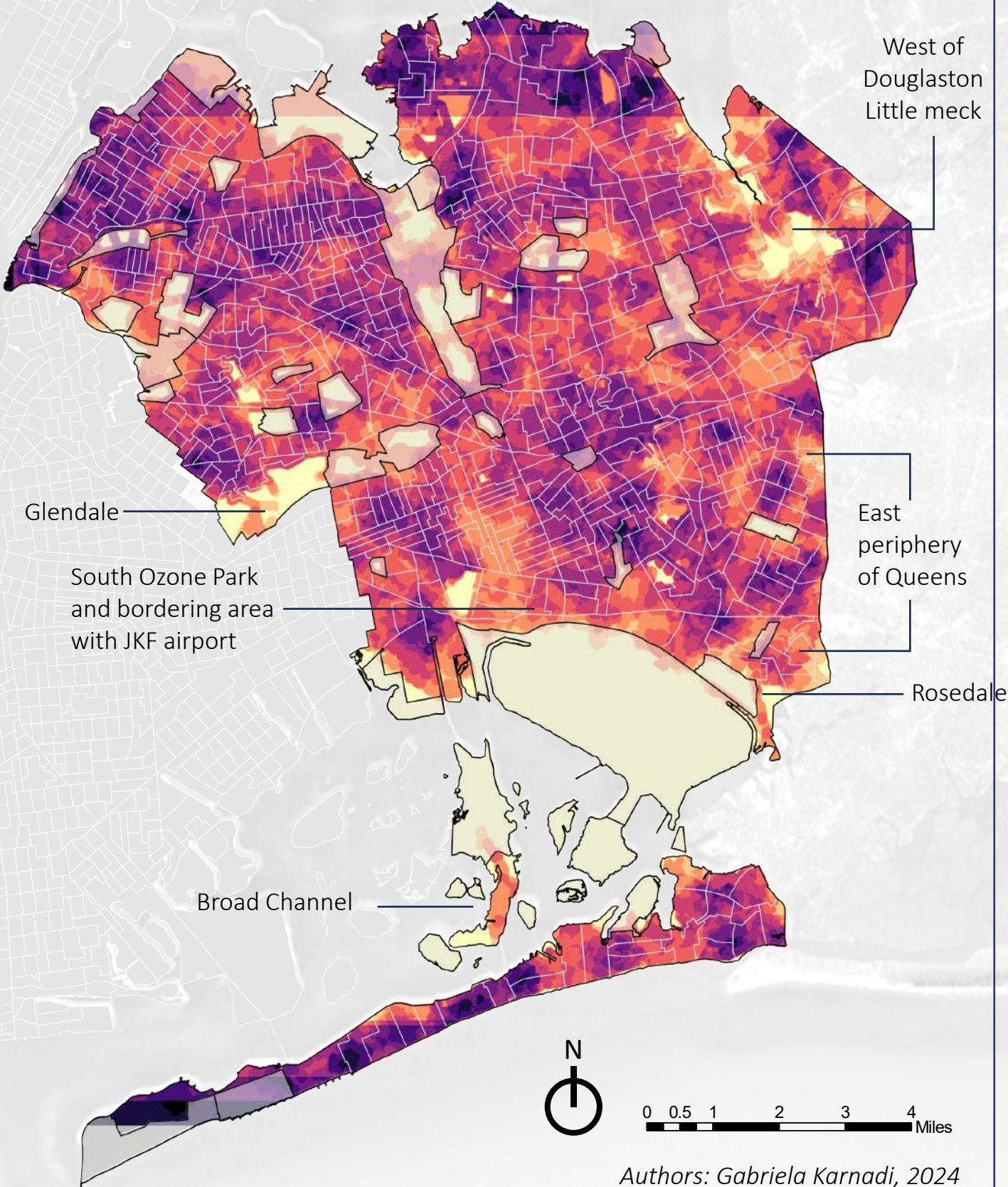
PRIORITY AREA TO DEVELOP
The lower income with the least amenities coverage

SPATIAL OPERATION
Weighted Analysis.

MATRIX
- Weighted Percentage
- Based on classification on Class-Network Analysis Table
- Pixel: 100. To gain a smoother pixel output and capture detailed area calculation (small change is documented). In this analysis, there are small blue dot areas that are able to be captured because of their 100 pixels.
- Scale: 3. To simplify in doing decision-making (high/medium/low priority)

WEIGHTED PERCENTAGE

Spatial
30%

Income
35%

Age Mapping
35%

CLASS-NETWORK ANALYSIS TABLE

Parameters	Para	Reclassify	Preference	Weighted Overlay
Aging Population	Less Aging Population	5	Less Prioritize	1
Scale 1-5	Most Aging Population	1	Prioritize	10
	NO DATA Population	NO DATA	NO DATA	NO DATA
Income	Least income	5	Prioritize	10
Scale 1-5	Most Income	1	Less Prioritize	1
	NO DATA Income	NO DATA	NO DATA	NO DATA
Spatial Analysis	Ideal	1		1
Scale 1-10	Not Ideal	10		10
	NO DATA	NO DATA	NO DATA	NO DATA

In classifying, the NODATA asserted as nodata because it denotes the void of the population (both income and age) thus it is an area that does not need to be calculated. The overarching remap in the weighted overlay is for **the priority factors** (many elderly population, least income, score bad in spatial parameter assessment) to get **10 (the highest number).**

The weighted overlay shows that there are many patches of the red area, which means high priority to be developed, the north area bordering JFK airport, the east periphery of Queens, Glendale, bordering area of Sunnyside and Hunters Point, South side of Astoria, Southeast of Ditmars Steinway, North of Middle Village and Sunnyside.

Excluded Area
Low Priority
Medium Priority
High Priority

N

0 0.5 1   2   3   4
Miles
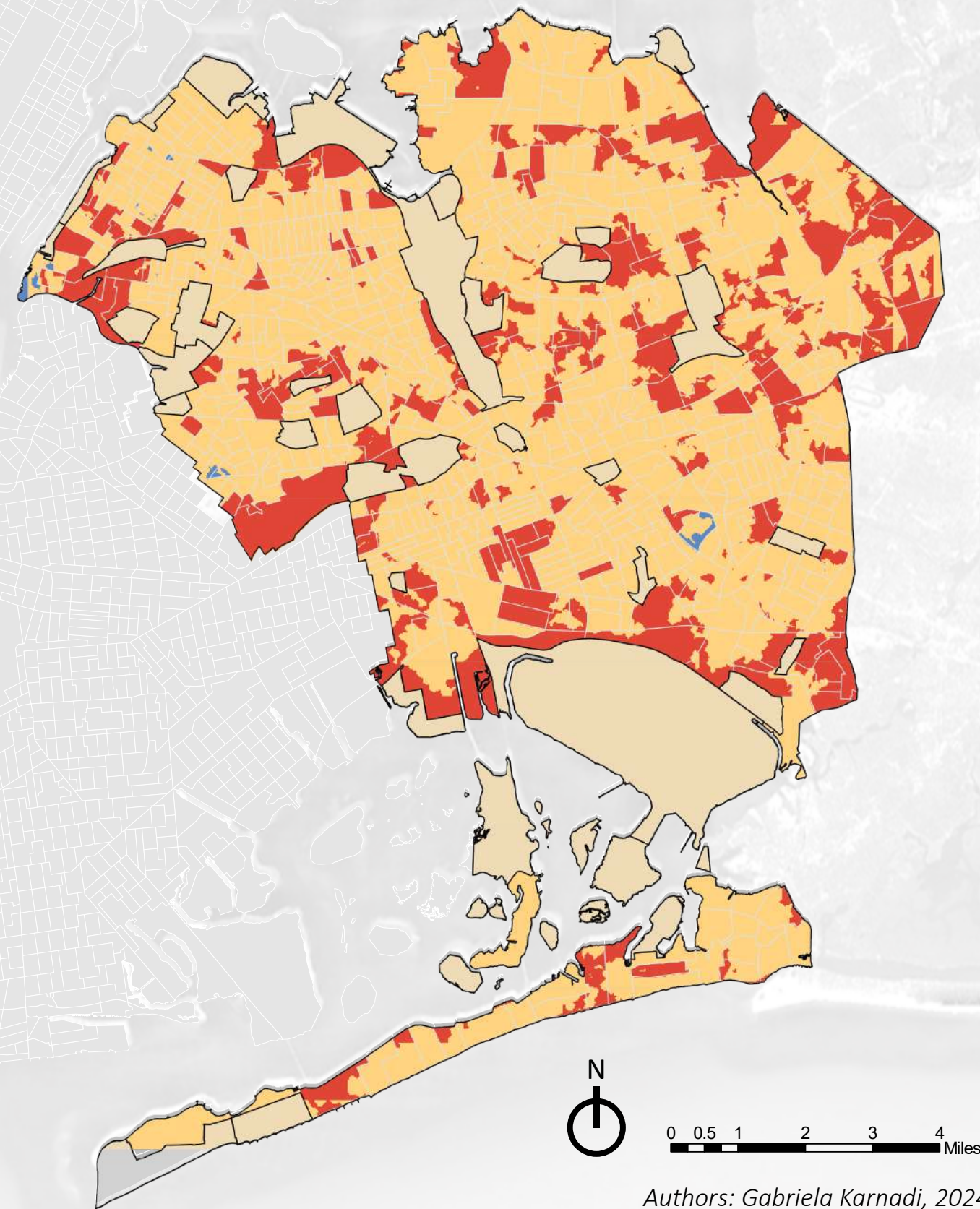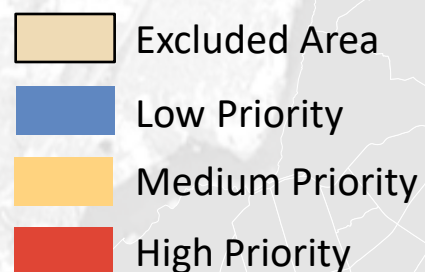
Authors: Gabriela Karnadi, 2024
Sources: data are from opendata.cityofnewyork.us and census.gov/data

Conclusion &
04 Recommendation

This section summaries the result of the study along with the recommendation for the city

ASSESSMENT *SUMMARY*

? *Research Questions Breakdown*

1. *What* are the *parameters* of the ageing-friendly city?

   Health care, groceries, accessible transportation, open spaces, senior center, and community center within walking distance

2. *What are & where* city features should be *improved*?

   The health care, senior center, and community center still lacking in several areas. Combining all of the ageing-friendly parameters, the areas that are in need of improvement are …

3. *Where* development should be *prioritized* for an ageing-friendly city?

   south of Queens, east periphery, some area around Jamaica Estate, and Sunnyside.

RECOMMENDATION

With a lower density than Manhattan but a higher elderly population, Queens has a big potential to develop many of its passive spaces into parks, senior centres or community centres, along with some allocation of spaces for health care. The picture here is taken in Astoria, one of the areas that is in need of priority improvement but has lots of passive spaces occupied by cars.

STUDY LIMITATION

- Not every grocery point is valid. Some might not provide the daily needs
- Transportation depends on the start and end points
- Topography is not considered
- Did not take-out big development in spatial analysis (Resort World NYC, etc.)
- Should consider sidewalk infrastructure other than accessible public transport as a means to be mobile

REFERENCE

Cortés-Vázquez, L. (2024). Preliminary Mayor's Management Report: Department of Aging. Retrieved from nyc.gov:

    https://www.nyc.gov/assets/operations/downloads/pdf/pmmr2024/dfta.pdf

Healthy ageing and functional ability. (2020, October 20). Retrieved from who.int: https://www.who.int/news-room/questions-

    and-answers/item/healthy-ageing-and-functional-ability

Institute for Urban Health. (2016). City Voices: New Yorkers on Health Aging: Health Challenges and the Role of Social Connections

    . New York: The New York Academy of Medicine.

Kaplan, J. (2024, February 7). Meet the typical millionaire: They're over 55, have a house worth nearly 7 figures, and are probably

    movign to Scottsdale. Retrieved from businessinsider.com: https://www.businessinsider.com/who-are-americas-millionaires-

    white-gen-xers-boomers-educated-stocks-2024-1

Manna, V. (2024, March 4). New York City families face hurdles in caring for elderly parents. Retrieved from ny1.com:

    https://ny1.com/nyc/all-boroughs/health/2024/03/04/new-york-city-families-face-hurdles-in-caring-for-elderly-parents-

Newman, A. (2024, June 28). Why More Older New Yorkers Are Ending Up in Homeless Shelters. Retrieved from nytimes.com:

    https://www.nytimes.com/2024/06/28/nyregion/nyc-homeless-older-people.html

Newman, A. (2024, June 28). Why More Older New Yorkers Are Ending Up in Homeless Shelters. Retrieved from nytimes.com:

    https://www.nytimes.com/2024/06/28/nyregion/nyc-homeless-older-people.html

Wex, S. (2024, June 21). The average American millionaire is 61 years old — here's why young people are having a hard time

    joining the $1M club. Retrieved from finance.yahoo.com: https://finance.yahoo.com/news/average-american-millionaire-61-

    years-110000860.html

Aging-Friendly City:

Assessment in Queens

F24 GIS Final Project | Gabriela Karnadi gk2691

2024